EFFECT OF AN OUTPATIENT EDUCATION PROGRAM ON KNOWLEDGE AND HEALTHY BEHAVIOR CHANGE OF PATIENTS WHO HAVE UNDERGONE PERCUTANEOUS TRANSLUMINAL CORONARY ANGIOPLASTY

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Carolyn M. Ehm

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Carolyn M. Ehm

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Approved by Committee:

Linda H. Brady, R.N., Ph.D.

Sandra Caligiuri, R.N., M.S.N.

Tom Lowe, M.S.

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An abstract of a Thesis by
Carolyn M. Ehm
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Drake University
Advisor: Linda H. Brady, R.N., Ph.D.

An outpatient education program for patients who have undergone percutaneous transluminal coronary angioplasty was evaluated to determine if there was an increase in knowledge or a change in healthy behaviors as a result of the program.

The sample consisted of 48 patients; 24 who experienced an outpatient education program and 24 who did not. Three instruments developed by the investigator were used. Both groups completed a demographics form, a knowledge assessment form and a lifestyle assessment form before the program began. The knowledge assessment form and lifestyle assessment form were completed again six weeks after the program.

Both groups showed a statistically significant increase in knowledge ($p < .05$). The experimental group showed a statistically significant increase in exercise behavior ($p < .05$). Because both groups showed a statistically significant increase in knowledge, this change could not be attributed to the program. Only the experimental group showed an increase in healthy behaviors, however. Therefore, the education program was effective in influencing patients to become more responsible for their treatment and care.

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Chapter I

INTRODUCTION

Background

Heart attacks, the leading cause of death in America, caused 497,850 deaths in 1989. This year as many as 1,500,000 Americans will have a heart attack and about 500,000 will die as a result (American Heart Association, 1992).

Risk factors linked to heart attack are heredity, age, gender, smoking, hypertension, elevated cholesterol, sedentary lifestyle, overweight, diabetes and stress. The federal government's 1990 Behavioral Risk Factor Surveillance survey revealed that 22% of Iowans smoke cigarettes, 25% are overweight, 61% have a sedentary lifestyle and 34% report no leisure-time physical activity (Des Moines Register, February 28, 1992). By modifying these risk factors persons can reduce the risk of having a heart attack.

An expanding consumer movement emphasizes that patients should be empowered to make decisions and take action for themselves. Education aims to provide opportunities for informed cardiac patients to make decisions and take actions to help them initiate health-related behaviors that reduce their risk of coronary heart disease (Wenger, Cleeman, Herd & McIntosh, 1986).

Cardiac rehabilitation (cardiac rehab) is a formal exercise and education program that begins in the hospital after the patient's physiologic condition has stabilized following a cardiac event such as a heart attack or open heart surgery. This is referred to as Phase I of cardiac rehab. A

cardiac rehab nurse meets with the patient and family to assess their educational and psychosocial needs. Individual and group sessions are held throughout the patient's hospitalization for the patient and family to address these needs. The patient's activity is gradually increased according to a progression schedule. Before discharge from the hospital patients have usually been to the inpatient exercise lab for low level exercise two to four times as part of Phase I.

Outpatient programs can and often do fill a vital educational and psychosocial support need for patients with coronary heart disease (CHD). Phase II of cardiac rehab begins after the patient has been discharged from the hospital and has had time to regain some strength. Phase II usually begins one to two weeks after discharge. Phase II lasts for six to twelve weeks and consists of monitored exercise, education and psychosocial support to aid the patient in making the needed lifestyle changes. Family members are included in the educational and psychosocial support sessions. Phase III of cardiac rehab is an ongoing supervised exercise and education program lasting from several months to years. It is initiated when the patient has demonstrated an increased capacity for exercise and when the responses to exercise (i.e. heart rhythm, heart rate, blood pressure and absence of symptoms) are normal. Spouses can participate in all aspects of Phase III, including exercise. In Phase II and III the nurse can continue to educate the patient and family.

The goals of cardiac rehabilitation are to restore the patient to an optimal physical, psychological and vocational level of functioning. Although traditionally cardiac rehab programs have emphasized exercise conditioning,

patient education has also been an important component of these programs (Gillilan, Beasley, Booth, DeAngelis, Warbasse & Plantholt, 1990). Educating the patient and family about risk factors, assisting in making lifestyle changes and helping the family understand and cope successfully with the impact of coronary heart disease are means to achieve the goals of cardiac rehabilitation (Gillilan et al., 1990).

A relatively new subset of patients seen in cardiac rehab programs are patients who have had a percutaneous transluminal coronary angioplasty (PTCA). This procedure is performed in the cardiac catheterization laboratory and involves the inflation of a balloon-tipped catheter in a blocked coronary artery. It is an alternative to coronary artery bypass graft surgery. These patients are hospitalized for an average of three days which allows very little time for education.

Purpose

The purpose of this study was to evaluate an outpatient education program for patients who had undergone PTCA to determine if the program increased knowledge and promoted healthy behavior changes in this group of patients.

Significance of the study

Consumer demand, rising medical costs, legal pressures and hospital accreditation have influenced health care professionals' concern with patient education. The tenth point in the American Hospital Association's Patient's

Bill of Rights is the right to health education. A patient who has not been provided with adequate educational care can no longer be considered adequately treated. The care of heart patients is largely a problem of education (Linde & Janz, 1979). Research on health teaching is a relatively new area. Results of inpatient cardiac education outcome research have been conflicting (Steele & Ruzicki, 1987). The failure to demonstrate a positive correlation between knowledge and compliance, however, does not negate the worth of health education nor does it release clinicians from existing ethical obligations to inform the patient. Patient education is an important component in the medical and nursing care of chronically ill patients. Not only does education help patients become more informed about the nature of chronic illness, it also helps the patient adopt behaviors in accordance with the treatment regimen (Knudson, Spiegel & Furst, 1981). Patients cannot be expected to comply with regimens they do not understand (Linde & Janz, 1979).

Evidence that inpatient education programs are effective in increasing patients' knowledge of coronary heart disease is found in studies by Mills, Barnes, Rodell & Terry (1985), Steele & Ruzicki (1987), Murphy, Fishman & Shaw (1989) and Raleigh & Odtohan (1987). The biggest increase in learning, however, according to Steele & Ruzicki (1987) and Rahe, Scalzi & Shine (1975), is in regard to patients' expectations regarding their return home. Sivarajan, et al. (1983) and Steele & Ruzicki (1987) found limited knowledge gains in areas requiring long-term behavior change. Scalzi, Burke & Greenland (1980) stated that inpatient programs, despite limited retention, create an atmosphere that encourages patients and families to ask questions and provide specific

information which appears to reduce their anxiety. They advocated sending printed information home with the patient for later use. Early entry into outpatient cardiac rehabilitation programs was advocated as continued instruction in follow-up visits has appeared to improve knowledge and compliance in certain areas (Scalzi, Burke & Greenland, 1980).

Chan (1990) found that the timing of educational intervention is as important as the content of cardiac teaching. Subjects indicated that it is more realistic for them to learn about their illness and its management during early convalescence post-discharge than during hospitalization. This finding suggests that post-discharge is a better time for educational efforts than during hospitalization. The value of follow-up educational services both to reinforce and extend in-hospital education is thus supported (Chan, 1990).

Very little research has investigated knowledge gain and behavior change in the outpatient education setting. Only two studies (Knudson, Spiegel & Furst, 1981 & Sivarajan, Newton, Almes, Kempf, Mansfield & Bruce, 1983) were found evaluating outpatient education programs. Only two studies were found addressing the educational needs of patients who have had a PTCA without having had a heart attack (Fletcher, 1986 & Murphy, Fishman & Shaw, 1989).

Definitions

Outpatient education was defined as a planned learning experience using a combination of teaching methodologies such as lecture, counseling and behavior modification techniques which enables the patient to understand

his/her own health care needs and influences him/her to become more responsible for his/her own treatment and care. This was the independent variable which was evaluated in this study.

Patients who have undergone PTCA were defined as those individuals who had undergone the PTCA procedure within the previous month prior to entering the study.

The dependent variables in this study were knowledge and healthy behavior change. Knowledge was defined as what is known about CHD and risk factors for CHD. It was measured as the number of correct responses on a knowledge assessment tool. The knowledge assessment tool was developed by the investigator and consisted of 25 multiple choice and true false questions over the content of the outpatient education program. Increased knowledge was evidenced by an increase in the number of correct responses on the knowledge assessment tool from the pretest administered immediately prior to the outpatient education program to the posttest administered immediately after the completion of the outpatient education program. Retention of increased knowledge was measured by administering the knowledge assessment tool again six weeks later.

Healthy behavior change was measured by self report on a lifestyle assessment tool which was developed by the investigator. It was administered immediately prior to the outpatient education program and again six weeks later to determine if a change in behavior had taken place. Healthy behaviors are those which have been demonstrated to reduce the risk of CHD.

Hypotheses

There were six research hypotheses investigated in this study:

1. There will be a significant increase in knowledge in patients who attend an outpatient education program.
2. There will be a significant increase in knowledge in patients who do not attend an outpatient education program.
3. There will be a significant difference in knowledge level in patients who attend an outpatient education program and patients who do not attend an outpatient education program.
4. There will be a significant increase in healthy behavior changes in patients who attend an outpatient education program.
5. There will be a significant increase in healthy behavior changes in patients who do not attend an outpatient education program.
6. There will be a difference in healthy behavior changes in patients who attend an outpatient education program and patients who do not attend an outpatient education program.

There were six null hypotheses which were tested to determine if they could be rejected:

1. There will be no significant increase in knowledge in patients who attend an outpatient education program.
2. There will be no significant increase in knowledge in patients who do not attend an outpatient education program.

3. There will be no significant difference in knowledge level in patients who attend an outpatient education program and patients who do not attend an outpatient education program.
4. There will be no significant increase in the healthy behavior changes in patients who attend an outpatient education program.
5. There will be no significant increase in healthy behavior changes in patients who do not attend an outpatient education program.
6. There will be no difference in healthy behavior changes in patients who attend an outpatient education program and patients who do not attend an outpatient education program.

Chapter II

REVIEW OF THE LITERATURE

Broad Nature of the Problem

As length of hospital stay decreases, in-patient teaching must be limited to what the staff can reasonably teach in the time allowed. There is also a limit to what patients can learn due to the stress of illness and hospitalization. Additionally, low risk patients whose hospitalization may be brief, may not have had the time to perceive that they have a disease that puts them at future risk (Linden, 1990). In the past, there were often several weeks of hospitalization during which patients were counseled about their disease, emotional adjustment, resumption of physical activity (including sexual activity) and risk factor intervention. Presently, with limited hospital stay and various testing procedures, little opportunity is available for the professional staff to address these issues. Distractions reduce the efficiency of teaching and learning (Burke, 1981). This study evaluated an attempt to deal with these barriers to learning.

Conceptual Framework

The Health Belief Model (HBM) provided a conceptual framework for the study. It provides a basis on which to plan educational interventions and behavioral outcomes for the patient (Marshall, Penckofer & Llewellyn, 1986). The HBM views the threat of disease as the key factor that influences behavioral choices of an individual (Godin, 1989). It was developed in 1958 by

G.M. Hochbaum to explain preventive health behaviors in response to a widespread failure of people to accept methods of disease prevention and screening tests for early detection of asymptomatic disease (Rosenstock, 1974). Health threat consists of the belief in personal susceptibility to a disease and the belief that the occurrence of the disease would have at least a moderately severe effect on some aspect of life. In individuals who have already been diagnosed as having health deviations, "resusceptibility, belief in the diagnosis and susceptibility to illness in general" are the defining characteristics of susceptibility (Redeker, 1988).

In the HBM, the person identified at risk is given health information. The desired outcome of an educational intervention is a change in behavior from those characterized as detrimental to those that will facilitate health. To modify behavior, it is necessary to identify variables that influence behavior (Godin, 1989). The four categories of the HBM are: perceived susceptibility to disease, perceived severity of disease, perceived benefits of and barriers to preventive care and cues to action. These variables incorporate the patient's health attitudes, beliefs, current situations and psychological factors (Hijeck, 1984). Hijeck (1984) states that nursing care can be designed to influence these variables.

Perceived susceptibility is the category of the HBM that indicates the degree of patient's belief that he or she can contract the disease. In the case of a patient with diagnosed coronary heart disease (CHD), this category investigates the patient's belief that the artery that was opened by PTCA can re-close or that blockages can form in other areas of the coronary arteries.

Concern has been raised by physicians and nurses involved in cardiac rehab programs that patients experiencing PTCA consider themselves to be cured of CHD and therefore are not motivated to modify lifestyle risk factors upon returning home (Gaw, 1992). Gaw (1992) conducted a pilot project to investigate patient perceptions of PTCA and their influence on patients to make lifestyle modifications upon returning home following PTCA. Interviews with 14 patients were conducted to ascertain their concerns and perceptions of PTCA. Less than half of the patients seemed to have motivation to make lifestyle changes or show a definite interest in reducing cardiac risk factors relating to their cardiac disease. Seven patients were uncertain about how PTCA would work to relieve their cardiac symptoms but felt certain that the procedure would alleviate their heart problems and hopefully cure them. Half of the patients interviewed, therefore, did not perceive themselves to be resusceptible to CHD.

The second category of the HBM, perceived seriousness of disease, is the extent to which a patient believes that the patient's own disease is serious. An individual might perceive that he or she is highly susceptible to a disease, but if that disease or its ramifications are not perceived as serious for him or her, then the probability that preventive or rehabilitative care would occur lessens (Hijeck, 1984). In Gaw's (1992) pilot project, patients who had planned on attending cardiac rehab said after they had been home 2-3 weeks that they no longer felt they needed to attend now that they were home and feeling better and free of cardiac symptoms since PTCA. Patients who experienced a "simple" and successful recovery considered themselves to be cured of their

CHD and believed that there was no need to make changes in their previous lifestyle to prevent recurrence of symptoms.

The third category of the HBM, perceived benefits and barriers, includes such variables as the availability of preventive/rehabilitative health care, the effectiveness of the care in altering the course of the disease, the monetary cost of care, the cost of time and inconvenience and the effect care has on the lifestyle of the patient and family (Hijeck, 1984). The more benefits the patient receives from the care, the more likely it is that the patient will take action. The more barriers to care, the more likely it is that the patient will not participate. In follow-up telephone conversations with selected patients 2-3 weeks after PTCA, Gaw (1992) identified that patients had found planned lifestyle modifications of cardiac risk factors more difficult to carry out than they had initially thought it would be. Of the five patients who had specifically stated they would perform risk factor reduction behaviors after PTCA, none had followed through.

A cue to action, the fourth category of the HBM, is a stimulus that must occur to trigger the appropriate action. This cue might be internal, like perception of bodily states, or external, like interpersonal interactions and the impact of communications media (Mikhail, 1981). It is thought that the stronger the perception of seriousness, susceptibility and benefits is, the less intense the cue needs to be to trigger a conscious decision. In the patient with CHD, the cue to action is assumed to be related to the learning about the disease and the availability of cardiac rehabilitation (Hijeck, 1984). One of Gaw's (1992)

recommendations for changes as a result of her pilot project is to provide basic, easy to understand information to the patient.

The HBM is limited to accounting for as much of the variance in individual's health related behavior as can be explained by their attitudes and beliefs (Janz & Becker, 1984). Other forces, such as emotional and social support, influence health actions as well. The model is predicated on the premise that "health" is a highly valued concern or goal for most individuals and also that "cues to action" are widely prevalent (Janz & Becker, 1984). The outpatient education program is the "cue to action" which is being evaluated in this study.

Learning Preferences and Needs of Patients

In assisting patients to obtain health information, the nurse must also consider how the patients prefer to learn (Boyd & Feldman, 1984). Boyd & Feldman (1984) found that 77% of heart patients preferred one-to-one interaction with a physician or nurse. This preference may be due to patients' assumptions that physicians and nurses are the most knowledgeable - not because patients necessarily learn best during these interactions. Additionally, physicians and nurses may be the most accessible health care providers (Boyd & Feldman, 1984). In a study by Karlik & Yarcheski (1987), a greater percentage of patients expressed a preference for physicians rather than nurses to teach them. This was particularly important to patients regarding the activity category. Patients in this study also believed that most of the dietary information should be taught by dietitians. In an educational needs

assessment administered by Knudson, Spiegel & Furst (1981), patients indicated they were more interested in listening to health professionals speak than they were in reading pamphlets, having individual counseling or participating in group discussions.

Formal teaching (a planned systematic approach to the needs of the health learner) versus informal teaching (unplanned teaching which is spontaneously directed toward the health learner) was investigated by Milazzo (1980) to ascertain which yielded a greater increase in knowledge by health learners. The control group received a pretest, posttest and informal teaching only. The experimental group received a pretest, teaching tool (slide presentation) and posttest. The experimental group attained statistically significant higher posttest scores than the control group supporting the theory that the health learners who received formal teaching exhibited greater knowledge than those who received informal teaching. Although some degree of learning occurred in both groups, a greater degree occurred in the formal teaching group.

In a descriptive study by Chan (1990), medications, anatomy and physiology and risk factors were perceived by patients to be most important and most realistic for them to learn. In a partial replication study by Karlik & Yarcheski (1987), both coronary care unit and post-discharge patients ranked the category of risk factors as most important to learn and the psychological category as the least important.

Previous Studies

While studies have shown an increase in knowledge with the use of structured teaching, this change in knowledge has not been consistently associated with compliance with health-promoting behaviors (Marshall, Penckofer & Llewellyn, 1986). An examination of previous studies relating to knowledge gain and behavior change as a result of patient education will follow.

Mills, Barnes, Rodell & Terry (1985) evaluated what effect an inpatient education program had on the knowledge level of patients. A population of 342 patients with ischemic heart disease was assigned to an inpatient cardiac patient education program consisting of five daily one-hour classes. Patients were randomly assigned such that one group received a pretest and a posttest assessment of knowledge while a second group received only a posttest assessment. The data suggested that learning had occurred and the assertion that the documented increase in knowledge can be attributed to the patient education program was supported. A difference score t test on knowledge scores was statistically significant. The authors concluded that additional research is needed to identify: (1) types of information that enhance the patient's awareness of his/her illness and (2) program structures and techniques that enhance patient motivation to comply with a prescribed treatment plan.

Steele and Ruzicki (1987) compared knowledge acquisition of inpatients following implementation of an in-hospital cardiac education program to confidence level with required behaviors after discharge.

Knowledge pretests were administered the night before surgery to patients who met criteria according to the random selection procedure. Posttests were administered in the same manner to a separate patient group on approximately the sixth or seventh postoperative day, after the cardiac education program but before the day of discharge. A confidence rating form was randomly administered to a third group of patients who met the criteria. This form was completed by patients after the cardiac education program on approximately the sixth or seventh postoperative day. The behavioral response form was mailed to subjects in this group approximately six weeks after each patient was discharged. This study demonstrated that patient teaching was effective in that patients demonstrated a statistically significant increase in knowledge and that the program appeared to prepare patients for discharge. Six weeks after discharge, patients reported that they did comply with predischarge instructions. The findings indicated that hospitalized patients appeared to learn more about activities of daily living than other areas, however. Areas showing limited knowledge gain were those that required long-term behavioral change, such as stress modification and dietary changes. The authors stated that modification of risk factor behavior would probably be more successful if followed up and reinforced in outpatient settings more conducive to patient learning and more relevant to patient experience.

Patients undergoing coronary angioplasty have shorter hospital stays than patients experiencing myocardial infarction (heart attack) or coronary artery bypass graft surgery (Fletcher, 1986). This new subset of patients also has different levels of educational preparation for the intervention procedure.

Fletcher (1986) evaluated the effectiveness of inpatient education on lifestyle changes of patients undergoing angioplasty. The 30 patients in the study were hospitalized for a mean of 4.9 days (range 2 to 18). All patients answered the outpatient follow-up telephone questionnaire within six months following discharge. A similar follow-up was done in 89 patients who were followed for a mean of 13.5 months after hospitalization for myocardial infarction (MI). In the post-MI group, 65% followed a fat-controlled diet compared to 60% of the angioplasty group; 60% stopped smoking in each group; 52% of patients with MI and 54% of patients undergoing angioplasty exercised regularly and 47% of patients with MI and 56% of patients undergoing angioplasty were working either full or part-time. The follow-up data for this angioplasty group is therefore comparable to that of this post-MI group with regard to diet, smoking, exercise and work. It was believed, however, that in this era of emphasis on prevention, the patients undergoing angioplasty should have been more compliant and adherent to risk factor modification. The rehabilitation team believed that the angioplasty procedure did not seem to be initially threatening to the patient and thus not a stimulus for the patient to have further interest in coronary risk factor modification. It was also believed that perhaps the short exposure time to education may be reflected in the compliance rate.

Rahe, Scalzi & Shine (1975) developed a questionnaire to measure patients' knowledge in six areas of post-MI management. The questionnaire was to serve both as a baseline estimate (by its first administration) and as an approximation of educational success of the teaching program (by its second

administration). The questionnaire was first administered after the patients had medically stabilized, usually between the fourth to seventh day of hospitalization. Shortly before discharge and after the implementation of a teaching program, the questionnaire was readministered. The subjects consisted of 24 patients under the age of 65 years who had had their first MI. Of prime concern was selecting subjects who had not (by experience) already learned about coronary heart disease. A small, but statistically significant, increase in total number of correct responses for the entire questionnaire was seen. Test-retest results indicated a significant increase in knowledge only in the section regarding the patients' expectations regarding their return home. It was thought that, during the first two weeks of hospitalization, patients are frequently too preoccupied with issues of survival, and/or family and work crisis related to their illness, to concentrate on the program. Teaching often was not effective until shortly prior to discharge at which time teaching concentrated on the patient's upcoming return home.

A prospective study was undertaken by Murphy, Fishman & Shaw (1989) to determine whether patients undergoing PTCA gained a significant amount of knowledge about the procedure and risk factors as a result of an inpatient assessment and education program developed for this special group of patients. Knowledge level was assessed before and after the PTCA and six months and two years later. The results demonstrated that the patient group, taken as a whole, did make statistically significant gains in information between their hospital admission and discharge after the procedure. Their knowledge levels returned to baseline at six months and two years. A major

limitation of this study, according to the researchers, was the quasi-experimental, one-group pretest-posttest design. The lack of a control group limited the conclusion that can be drawn about the extent to which the educational program itself was responsible for patient learning. Because patients were not randomized into different treatment conditions, it is difficult to ascertain exactly how this approach differs from normal consultation given to patients before angioplasty. The researchers suggested that educational efforts may need to be continued during the period after hospital discharge to maintain the level of risk factor knowledge achieved during hospitalization.

A study by Raleigh and Odtohan (1987) examined the effectiveness of a structured teaching program on knowledge gain in patients with MI. Subjects were randomly assigned to either the experimental or control group. A knowledge pretest was administered to both groups. Participants in the experimental group were given a program folder and taught according to a specific teaching plan. The participants in the control group did not receive the program folder. A nurse spent four 15-20 minute sessions in general, noninformational conversation with each participant in the control group. Any questions the participants in the control group had were answered and routine medication instruction was given. The tests before and after discharge showed a statistically significant increase in knowledge of the experimental group. Although the control group did not show a statistically significant increase in knowledge, both groups retained very well what information they had acquired. This study suggests, on a small scale, the effectiveness of a structured education program for these patients with MI. The limitation of

this study was its small sample size of nine subjects in each group. The authors suggested that their study could be replicated with the use of a larger sample.

One of the objectives of a study by Scalzi, Burke & Greenland (1980) was to test the hypothesis that coronary patients and families who have participated in an organized educational program will demonstrate a greater understanding of the illness and prescribed treatment plan than those who have not participated in such a program. Nineteen patients in the experimental group participated in an organized educational program designed to increase their knowledge of coronary heart disease and methods of risk factor reduction. They were given a packet of printed educational materials to study and take home. This was supplemented by individual instruction by the nurse investigator and a registered dietitian. Patients in the control group did not participate in an organized educational program and did not receive printed educational materials or individual instruction from the nurse investigator. If patients in the control group asked questions of the nurse investigator, they were instructed to refer their questions to the appropriate member of the health care team, e.g., nurse, physician or dietitian. A teaching evaluation questionnaire served as a pretest and posttest to assess knowledge of coronary heart disease. There were no statistically significant changes in the teaching evaluation scores over time and no statistically significant differences between groups. The negligible improvement suggests that retention of information during the acute phase of illness is very limited.

Marshall, Penckofer & Llewellyn (1986) conducted a study to determine the effect of a structured postoperative teaching program on the knowledge of patients who undergo coronary artery bypass graft (CABG) surgery and whether a change in knowledge affects their postoperative health-promoting behaviors. To systematically evaluate the success of the structured teaching program, a test was devised to measure the patient's knowledge. The test examined six areas addressed in the teaching program. A preoperative and postoperative health assessment interview was also completed. Cardiac risk factors were identified for each patient. Patients in the control group received teaching by an unstructured method. Both groups were tested before the teaching program and after the program was completed. At 4-6 weeks after surgery, a postoperative health assessment was obtained. Compliance was measured by self-report. There were 30 patients in each group. Both groups showed statistically significant gains in knowledge from pretest to posttest. However, only those patients who received structured teaching showed a statistically significant increase in compliance. Recommendations for future study included a continued investigation of teaching methods for patients who are hospitalized and those in an outpatient setting.

Another study on the effect of a teaching program on knowledge and compliance of cardiac surgery patients was carried out by Linde & Janz (1979). One group was composed of patients having CABG; the other, patients undergoing valve replacement. Patients in both groups were given a knowledge test prior to institution of the teaching program and were retested at discharge, one month later and 3-4 months later. The findings included

statistically significant changes in knowledge scores for both groups from the preoperative test to the discharge test. There was no statistically significant difference between scores from discharge to the first postoperative visit and from the first postoperative visit to the second postoperative visit. The hypothesis that stated patients who receive the postoperative patient education program will have higher rates of compliance than the rates reported in a prior study on compliance of cardiac patients was supported. The investigators concluded that a comprehensive patient education program had a positive influence on patient knowledge and compliance. When teaching and reinforcement are integral components of outpatient care, the researchers believe that knowledge scores and compliance rates should remain high. The researchers also stated that attention should be given to repeating the study using more sophisticated and reliable measures of compliance.

Because of evidence that patients have limited recall of teaching done during hospitalization, Sivarajan, Newton, Almes, Kempf, Mansfield & Bruce (1983) decided to offer a teaching-counseling program only after discharge. The study participants were men and women, 70 years of age or younger, hospitalized in seven hospitals with a primary diagnosis of acute MI. All participants received some teaching from the nursing staff prior to discharge. Programs varied from information provided in booklets and cassette tapes to a detailed teaching program that included testing before and after instruction. During hospitalization, one third of the patients in each hospital were randomly assigned to the control group, the other two thirds to the exercise group. At discharge, patients in the exercise group were randomly assigned to

a continuing program of exercise only or to a program of exercise plus teaching and counseling. During hospitalization, data about behavior before admission to the hospital had been collected. To measure change in behaviors related to risk factors, preadmission data were compared with data at three months and six months. The program on risk factors demonstrated only limited effectiveness in relation to risk factor modification. It was educational in that it provided accurate and practical information to the patients who had already made the decision to implement changes. However, the authors found that the program did not provide the needed additional stimulus for long-term behavior change.

Knudson, Spiegel & Furst (1981) evaluated patients' cognitive and behavioral responses to an outpatient arthritis education program. The objectives of the educational program were to increase knowledge and motivate patients to make behavioral changes consistent with the treatment regimen. The independent variable in this study was a group educational program. The dependent variables were changes in program-related knowledge and self-reported behavior of the participants. Program effectiveness was determined by comparing the change in program-related knowledge and behaviors of interested participants with that of interested nonparticipants over a period of time. Twelve patients participated in the study: six in the control group and six in the treatment group. The treatment group participated in an educational program consisting of 6 one-hour seminars conducted weekly. The control group received no instruction other than that normally given by the physician during the clinic visit. Four different testing devices were employed: 1) a

needs assessment, 2) a pretest to objectively measure certain cognitive and behavioral factors- demographic questions were included to determine if the treatment and control groups were equivalent on various characteristics that might influence the amount of change in the dependent variables, 3) a posttest to determine the change in program related knowledge and activities (the same cognitive and behavioral questions as on the pretest) and 4) a participant evaluation was completed by the treatment group at the conclusion of the program in order to critique the classes. The posttest was administered to the treatment group at the final seminar and was mailed to the control group. A cover letter was sent with the questionnaire asking patients not to refer to other materials when answering the cognitive questions in order to reduce this chance for bias. A three month follow-up was conducted to determine if differences were maintained. This was a repeat of the posttest and was mailed to both the treatment and control groups. The pretest results demonstrated that the two samples were initially equivalent on the cognitive assessment. The cognitive score of the treatment group increased 22.5% from the initial pretest to long-term follow-up compared to a 5.1% increase by the control group. In addition to answering more of the questions correctly on the posttest and follow-up, the experimental group reported an increase in performance of self-care activities after the educational program. The authors neglected to say whether these differences were statistically significant, however. The control group showed a decrease in performance of self-care activities. The reason for this is uncertain. The investigators state that these behavioral measures are rough estimates of actual performance. A quasi-experiment control group

design was used in this study. Random assignment was not possible, therefore as it was pointed out by the investigators, it cannot be assumed that the two groups were equivalent on untested variables that may have influenced the change in the dependent variable. An essential element of an evaluative study, according to the investigators, is the long-term follow-up. Immediate posttests tend to reflect short-term rather than long-term learning. A follow-up is definitely needed for programs conducted over a brief period of time as compared with programs that last many weeks or months. The investigators point out the need for more objective measures for measuring behavior change as it is impossible to determine the validity of self-reported measures.

The literature has not concluded that inpatient education programs are successful at stimulating behavior change among patients. The two studies of outpatient education programs that were reviewed demonstrate conflicting findings. Because of decreasing length of hospital stays, more education will need to take place in outpatient settings. Methods of teaching in these settings need to be evaluated for their effectiveness.

Chapter III

METHODOLOGY

Subjects

This study took place in a major midwestern medical center which specializes in the care of cardiovascular patients. Subjects were 48 patients who were diagnosed with coronary artery disease and had undergone elective PTCA. There were 24 subjects in the experimental group and 24 in the control group. Subjects were matched according to the criteria of first PTCA or repeat PTCA and according to whether or not the subject was participating in a phase II cardiac rehab program while participating in the study. A convenience sample was used.

Instruments

Three instruments were used to conduct this study. They were a knowledge assessment tool, a lifestyle assessment tool and a demographics form.

A consent form was also necessary. The consent form insured informed consent and that the rights of human subjects were protected (Appendix A). To maintain security of the consent forms during the study, they were kept in a file drawer in the investigator's home.

The knowledge assessment tool (Appendix B) measured the dependent variable of knowledge change. It consisted of 25 multiple choice and true/ false questions over the content taught in the outpatient education program. The areas covered in the tool were understanding heart disease, coronary risk

factors, exercise for a healthy heart, a healthier way of eating and stress management. The investigator attended the outpatient education program to be evaluated and developed the knowledge assessment tool from the content taught. Content validity was determined by having the patient educators, who teach the program, evaluate the questions on the test. Eighty-five percent of the questions were agreed upon by the patient educators for inclusion in the tool. The educators also agreed that the content on the knowledge assessment tool was consistently presented in the program. Two lay persons read the knowledge assessment tool and evaluated whether the terms were understandable. Both persons were in agreement that the terms were understandable.

Reliability of the knowledge assessment tool was confirmed by test-retest. The tool was administered on two separate occasions one week apart to ten participants in the cardiac rehab phase III program. The Pearson product-moment test of reliability was performed and resulted in a value of .569.

The lifestyle assessment tool (Appendix C) measured the dependent variable of behavior change. The patient was asked to indicate what his/her actions had been over the last six weeks by agreeing or disagreeing with a statement regarding his/her behavior. The behaviors assessed were smoking, exercise, fat and cholesterol intake, sodium intake and stress management. Content validity was determined by having the same patient educators evaluate the behaviors to be assessed. All of the behaviors on the lifestyle assessment tool were agreed upon 100% by the patient educators.

Demographic data were obtained to determine if the treatment and control groups were equivalent on various characteristics that might influence the amount of change in the dependent variables. The subjects were requested to indicate age, gender, highest level of education and sources of information regarding heart disease. The subjects were also asked if they were currently participating in a phase II cardiac rehabilitation program and if this was their first PTCA or a repeat PTCA in order to match them on these two variables when assigning to groups (Appendix D).

Procedures

After receiving approval from the Human Subjects Research Review Committee at Drake University and the Institutional Review Committee (IRC) at the hospital where the research took place, the investigator proceeded with a pilot study prior to the major collection of data. The pilot study was conducted exactly as the proposed major research study using only ten clients. Two changes were made in the proposed methodology as a result of the pilot study. The experimental group in the pilot study started with 12 subjects but seven withdrew before the education program was over resulting in only five subjects in the experimental group. During the major study, therefore, the investigator asked each subject if he/she planned to stay for the entire education program before asking him/her to fill out the forms. If the subject indicated that he/she did not plan to stay for the entire program, he/she was not included in the study. The investigator also devised a list of verbal instructions to give to the subjects individually before filling out the forms

based on subjects' misunderstandings on how to complete the forms during the pilot study.

A phase I cardiac rehabilitation nurse met with each patient who had undergone PTCA. The patient's cardiac risk factors were identified and any questions were answered by the phase I nurse. Guidelines for exercise and activities after discharge were given. A booklet on heart disease was given to each patient and he/she also received instructions and information cards on the medications he/she was to take after discharge. A dietitian met with each patient for instruction on a low cholesterol, low sodium diet. The patient was given a nutrition booklet, as well. Each patient was informed of the outpatient education program for patients who have undergone PTCA which is held on the first Tuesday of each month in the outpatient cardiac rehab area. Each patient received a phone call from a secretary or a nurse in cardiac rehab on the Friday or Monday preceding the education program to remind him/her of the program and to ask if he/she was planning on attending.

The investigator obtained the names of potential subjects from the phase I nurses and individually approached them 1-2 days after they had undergone elective PTCA and were still hospitalized. Upon approaching the potential subjects, the investigator identified herself as a graduate student in nursing at Drake University and a staff nurse in a cardiac rehabilitation program. The purpose of the study, how the results were to be used and how the patients were selected for participation was explained. The patients were informed that participation was voluntary and that they had the right to refuse to participate. Patients who agreed to participate were informed of their right to

withdraw from the study at any time and were informed that withdrawl would not affect their care. The patients were informed of their right to request a copy of the results of the study. In order to protect patients' privacy, confidentiality was assured. The patients were informed of the potential risks and benefits of participating in the study. The potential risk was the psychological and/or emotional stress of taking a written test. The potential benefit was helping to improve future patient care by participating in the study. Patients who agreed to participate in the study were asked to read and sign the consent form. The patients were assigned a code number at the time they entered the study.

Assignment to the experimental or control group was determined by whether or not the patient attended the outpatient education program. The patients who agreed to participate in the study and attended the outpatient education program comprised the experimental group. All subjects in the experimental group completed the knowledge assessment tool, the lifestyle assessment tool and the demographics form immediately before the outpatient education program began. Immediately following the program, all subjects again completed the knowledge assessment tool.

Patients who agreed to participate in the study but did not attend the outpatient education program comprised the control group. Subjects in the control group were sent the following forms in the mail: a cover letter (Appendix E), the knowledge assessment tool, the lifestyle assessment tool and the demographics form. They were asked in the cover letter to complete the

three forms and return them to the investigator. An envelope addressed to the investigator, with postage affixed, was included in the packet of material.

The completed knowledge assessment and lifestyle assessment tools were coded to indicate whether this was the patient's first balloon procedure (PTCA) or whether it was a repeat balloon procedure, according to how the subject responded to the question "Have you undergone the balloon procedure before this time?" on the demographics form. Patients in the experimental group who had undergone their first PTCA were matched with patients in the control group who had undergone their first PTCA. Patients in the experimental group who had undergone a repeat PTCA were matched with patients in the control group who had undergone a repeat PTCA. Patients were matched in the same manner according to whether or not they were participating in a phase II cardiac rehab program at the time they were participating in the study.

Six weeks after the outpatient education program, subjects in both groups were sent the knowledge assessment and lifestyle assessment tools with a cover letter (Appendix F) which asked them to return the completed forms within a week. A stamped envelope addressed to the investigator was included with the material. The forms were coded to identify who the form was from and which group the subject was in. Only the investigator saw the completed forms. The results of individual forms remained confidential. The investigator telephoned subjects who had not returned the completed forms within one week and reminded them that their participation was still important. Two attempts were made to contact each subject who required follow-up.

The data were collected for four months. The forms were stacked in numerical order according to code number and group. Beginning with the experimental group form with the lowest code number, the investigator went through the stack of control group forms, starting with the lowest code number, until a form was found which matched the experimental group form on the variables of first or repeat PTCA and participation in a phase II cardiac rehab program. This process was repeated until all of the experimental forms were matched with a control form on these two variables.

The content model, as described by Knowles (1973), is utilized in the outpatient education program, or intervention. The patient educators who teach the program have pre-determined what they feel is necessary for the patients to know. The intervention consists of content on heart disease and its treatment, coronary risk factors, exercise for a healthy heart, a healthier way of eating and stress management. The content on heart disease, its treatment and coronary risk factors is taught by one of four nurses who work in the phase I cardiac rehabilitation program. The section on exercise is taught by a master's prepared exercise physiologist. A healthier way of eating is taught by a master's prepared dietitian and stress management is taught by a nurse with a master's degree in counseling. The format includes lecture, videotape and slide presentations. Opportunities for questions from patients and others present are made available. Several handouts are distributed.

Chapter IV

ANALYSIS

Introduction

The primary purpose of this study was to investigate knowledge and healthy behavior change as a result of an outpatient education program for patients who had undergone PTCA. The review of the literature on patient education and its effects revealed that most research has been done on inpatient education programs. The information obtained in this study will add to the body of nursing knowledge and will help direct outpatient education efforts.

Data were generated from three tools which the subjects completed at various stages of the study. The demographics tool provided data to compare similarities and differences of the two groups. The knowledge assessment tool measured the subjects' understanding of heart disease, risk factors and treatments. The lifestyle assessment tool was a self-report measure of the subjects' healthy behaviors.

One hundred patients signed consents and agreed to participate in the study. Twenty-eight subjects started in the experimental group and 26 completed the study. Two subjects in the experimental group had incomplete tools and could not be included. This resulted in 24 subjects in the experimental group and a 86% response rate. Seventy-two subjects started in the control group and 46 completed the study. Three subjects in the control group had incomplete tools and could not be included. This resulted in 43

subjects in the control group and a 60% response rate. The number of total available subjects was 67 which resulted in a 67% response rate.

Description of the Sample

The total sample contained 48 subjects, 24 in the experimental group and 24 in the control group. Table 1 describes the demographic data of the total sample, the experimental group and the control group.

Insert Table 1 about here

Knowledge assessments were completed by subjects in the experimental group before the education program (pretest), immediately after the program (posttest 1) and six weeks later (posttest 2). Knowledge assessments were mailed to subjects in the control group the day after the education program (pretest) and again six weeks later (posttest 2). Table 2 presents the knowledge assessment scores from the pretest and posttests for the total sample, the experimental group and the control group.

Insert Table 2 about here

Table 1. ***Demographic Data of Subjects***

	Total Sample	*Experimental Group*	*Control Group*
Age			
Mean	62.4	59.8	64.9
Range	37-81	37-79	49-81
Previous PTCA	16 (33.3%)	8 (33.3%)	8 (33.3%)
Rehab. Participant	2 (4%)	1 (4%)	1 (4%)
Males	33 (69%)	19 (79%)	14 (58%)
Females	15 (31%)	5 (21%)	10 (42%)
Education			
8th grade	3 (6%)	2 (8%)	1 (4%)
Some HS	4 (8%)	0 (0%)	4 (17%)
HS grad.	22 (46%)	11 (46%)	11 (46%)
Some coll.	13 (27%)	8 (33%)	5 (21%)
BS or above	6 (13%)	3 (13%)	3 (12%)
Sources of Information			
Physician	87%	83%	92%
Newspapers			
Magazines	75%	87%	62%
Nurses	60%	62%	58%
Family & Friends	60%	62%	58%
TV & Radio	58%	58%	58%
Educ. Prog.	42%	37%	46%

Table 3 presents knowledge assessment scores of the whole group with respect to history of previous PTCA, participation in a phase II cardiac rehab program at the time of the study, gender, education level and age group.

Insert Table 3 about here

Table 2. ***Knowledge Assessment Scores***

	Total Sample	*Experimental Group*	*Control Group*
Pretest	70%	70%	70%
Posttest 1	-	80%	-
Posttest 2	77%	79%	75%

Table 3. ***Knowledge Assessment Scores According to Variables***

	*Pretest **	*Posttest 1 ***	*Posttest 2 **
Previous PTCA	74%	86%	80%
No previous PTCA	68%	77%	76%
Cardiac rehab.	70%	88%	76%
No cardiac rehab.	70%	80%	77%
Male	72%	82%	79%
Female	65%	74%	74%
High school graduate or less	66%	75%	73%
Some college or above	75%	86%	83%
Age			
37-52 yrs.	74%	84%	78%
53-68 yrs.	72%	83%	78%
69-81 yrs.	67%	70%	76%

* Data from total sample

** Data from experimental group only

Analysis of Hypotheses

Null hypothesis 1: There will be no significant increase in knowledge of patients who attend an outpatient education program.

To test this hypothesis, a paired t-test (one-tailed) with an alpha level of .05 was performed. A significant difference was found from the pretest to posttest 1 (p=.0001) and from the pretest to posttest 2 (p=.0001). Therefore, null hypothesis 1 was rejected.

Null hypothesis 2: There will be no significant increase in knowledge of patients who do not attend an outpatient education program.

To test this hypothesis, a paired t-test (one-tailed) with an alpha level of .05 was performed. A significant difference was found from the pretest to posttest 2 (p=.013). Therefore, null hypothesis 2 was rejected.

Null hypothesis 3: There will be no difference in knowledge level of patients who attend an outpatient education program and patients who do not attend an outpatient education program.

One-tailed t-tests for independent groups with an alpha level of .05 were performed on the knowledge assessment pretest and posttest scores. There was no significant difference between the two groups on the pretest or posttest 2 scores. Thus, the decision was to fail to reject null hypothesis 3.

Null hypothesis 4: There will be no increase in the healthy behavior changes in patients who attend an outpatient education program.

The statistical test used to measure this change was Chi square with an alpha level set at .05. A significant increase in exercise behavior was reported by this group (x 2 =.0237). Therefore, null hypothesis 4 was rejected.

Null hypothesis 5: There will be no increase in the healthy behavior changes in patients who do not attend an outpatient education program.

The statistical test used to measure this change was Chi square with an alpha level set at .05. No significant changes in healthy behaviors were found in this group. Therefore, the decision was to fail to reject null hypothesis 5.

Null hypothesis 6: There will be no difference in healthy behavior changes in patients who attend an outpatient education program and patients who do not attend an outpatient education program.

The statistical test, Chi square with an alpha level of .05 was performed to measure this change. The group that attended the outpatient education program showed an increase in exercise behavior (x=.0237). Thus, null hypothesis 6 was rejected.

Incidental Findings

Unpaired t-tests were performed on variables that may have affected changes in the dependent variables. Tests done on posttest 1 included the experimental group only as it was the only group to take posttest 1.

Males had significantly higher scores than females on the pretest (p=.0319). There was no significant difference found between males and females on posttest 1 and posttest 2.

Subjects who had had a previous PTCA had significantly higher scores (p=.0423) on posttest 1 than subjects who had not had a previous PTCA. No significant difference was found, however, on the pretest or posttest 2.

No significant difference was found on the pretest, posttest 1 or posttest 2 scores when comparing subjects who were participating in a phase II cardiac rehab program at the time of the study with subjects who were not participating in a phase II cardiac rehab program.

A significant difference in all test scores was found between subjects with a high school education or less and subjects with some college education or a bachelor's degree or above. Subjects with more than a high school education scored significantly higher. On the pretest p=.0091, on posttest 1 p=.0155 and on posttest 2 p=.0006.

If subjects indicated on the lifestyle assessment that they had decreased their intake of fat, cholesterol and/or sodium, they were asked to list three ways in which they had done so. Appendix G illustrates the ways in which subjects had reduced fat and cholesterol in their diet prior to the education program. Appendix H illustrates how subjects had reduced fat and cholesterol in their diet six weeks following the education program. Appendix I illustrates the ways in which subjects had reduced sodium in their diet prior to the education program. Appendix J illustrates how subjects had reduced sodium in their diet six weeks following the education program.

Chapter V

DISCUSSION AND CONCLUSIONS

The purpose of this study was to determine whether there were differences in knowledge and healthy behaviors among patients who had undergone percutaneous transluminal coronary angioplasty (PTCA) and attended an outpatient education program and patients who had undergone PTCA and did not attend an outpatient education program. The theoretical framework for the study was the Health Belief Model (HBM). The HBM views the threat of disease as the key factor that influences behavioral choices of an individual (Godin, 1989). In the HBM, the person identified at risk is given health information. The desired outcome of an educational intervention is a change in behavior from those characterized as detrimental to those that will facilitate health.

Three instruments were used in the study. The knowledge assessment tool was a 25 question multiple choice and true/false test covering heart disease and treatments, cardiac risk factors, exercise, nutrition and stress management. The lifestyle assessment tool asked for information regarding the patients' healthy behaviors in the following areas: smoking, exercise, cholesterol, fat and sodium intake and stress management. A demographics form was used to determine similarities and differences in characteristics of the experimental and control groups. All three instruments were developed by the researcher. The patients who attended the outpatient education program made up the experimental group and completed all three instruments immediately

prior to the outpatient education program (pretest). The experimental group repeated the knowledge assessment immediately after the education program (posttest 1). The patients who did not attend the outpatient education program made up the control group. This group was mailed all three instruments the day after the education program to complete and return by mail. Six weeks later both groups were mailed the knowledge assessment tool and the lifestyle assessment tool to complete and return by mail (posttest 2).

Demographics

Forty-eight patients participated in the study; twenty-four in the experimental group and twenty-four in the control group. Characteristics of the sample were identified. The two groups were identical in the areas of history of previous PTCA and participation in a phase II cardiac rehab program at the time of participation in the study. The mean age of subjects in the experimental group was 5.1 years younger than the control group. There were four times as many males as females in the experimental group. The number of males and females in the control group was almost equal. Sources of information regarding heart disease were similar for the two groups in all but two areas. Subjects in the experimental group listed newspapers and magazines as a source of information more frequently than the control group. Subjects in the control group listed education programs as a source of information more often than those in the experimental group which is interesting as subjects in the control group did not attend the outpatient

education program in this study. As a group, subjects in the experimental group were more highly educated than those in the control group.

Correlation With the Literature

Null hypothesis 1 stated: There will be no significant increase in knowledge of patients who attend an outpatient education program. A paired t-test (one-tailed) was used to test this hypothesis. Null hypothesis 1 was rejected as there was a significant increase in knowledge from the pretest to posttest 2 in the group of patients that attended the outpatient education program. Null hypothesis 2 stated: There will be no significant increase in knowledge of patients who do not attend an outpatient education program. A paired t-test (one-tailed) was also used to test this hypothesis. Null hypothesis 2 was rejected as there was a significant increase in knowledge from the pretest to posttest 2 in the group that did not attend the outpatient education program. Thus, both groups showed a statistically significant increase in knowledge. Null hypothesis 3 stated: There will be no significant difference in knowledge of patients who attend an outpatient education program and patients who do not attend an outpatient education program. A one-tailed t-test for independent groups was performed to test this hypothesis. There was no significant difference in knowledge between the groups and the decision was to fail to reject null hypothesis 3. Because the increase in knowledge of the patients who attended the education program was not significantly greater than the group that did not attend, the increase can not be attributed to the education

program. A Type II error may have occurred, however, due to the small sample size and the convenience sampling method.

The John Henry effect may have been at work with the group that did not attend the education program. Because they knew they were in a study, this group may have worked harder at learning independently than if they were not in a study to show they were just as good as the group that attended the education program. This effect makes it difficult to generalize the findings to other groups.

The results of this research do not correlate with the literature which shows significant increases in knowledge as a result of patient education programs. Most of the research in the literature is on inpatient education programs, however. Studies by Linde and Janz (1979), Marshall, Penckofer and Llewellyn (1986), Raleigh and Odtohan (1987), Rahe, Scalzi and Shine (1975), Steele and Ruzicki (1987) and Mills, Barnes, Rodell and Terry (1985) all showed a significant increase in knowledge in patients who participated in an inpatient education program when compared with patients who did not attend an inpatient education program. The studies by Steele and Ruzicki (1987) and Rahe, Scalzi and Shine (1975) showed increased knowledge in the areas of discharge instructions only, however. Raleigh and Odtohan's study (1987) was limited by its small sample size.

The only study found in the literature review which investigated increase in knowledge as a result of an outpatient education program was by Knudson, Spiegel and Furst (1981). The results showed a 22.5% increase in knowledge in the treatment group and a 5.1% increase in knowledge in the

group which did not receive the treatment. The investigators neglected to state whether this was a significant difference, however.

Null hypothesis 4 stated: There will be no increase in the healthy behavior changes in patients who attend an outpatient education program. Chi square analysis was performed to test this hypothesis. There was a statistically significant increase in exercise behavior and hypothesis 4 was rejected. Null hypothesis 5 stated: There will be no increase in the healthy behavior changes in patients who do not attend an outpatient education program. Chi square was also used to analyze this hypothesis. The decision was to fail to reject the hypothesis since there was no increase in healthy behaviors in this group. Null hypothesis 6 stated: There will be no difference in healthy behavior changes in patients who attend an outpatient education program and patients who do not attend an outpatient education program. Null hypothesis 6 was rejected as the patients who attended the outpatient education program showed an increase in exercise behavior.

So, although both groups showed an increase in knowledge, only the group that attended the outpatient education program showed an increase in healthy behavior. The outpatient education program was effective, then, in influencing the patient to become more responsible for his/her own treatment and care which is integral to the definition of outpatient education in this research study. The possibility of a Type I error can not be ruled out, however.

The literature does not give clear evidence to support the effectiveness of outpatient education programs in behavior changes. In the study by

Knudson, Spiegel and Furst (1981), an increase in behavior changes consistent with the treatment regimen was seen in the group that attended the outpatient arthritis education program. The authors neglected to state whether this increase was statistically significant, however. The group that did not attend the education program showed a decrease in behaviors consistent with the treatment regimen. The reason for this was uncertain. Sivarajan, Newton, Almes, Kempf, Mansfield and Bruce (1983) concluded that an outpatient education program did not provide the needed stimulus for long-term behavior change.

Most of the research on healthy behavior change has been done on inpatient education programs. A study by Fletcher (1986) evaluated the effectiveness of inpatient education on lifestyle changes of patients undergoing PTCA compared to patients who had had a myocardial infarction (heart attack). The two groups were comparable in their actions. The author did not state if the behaviors were a result of the program. Marshall, Penckofer and Llewellyn (1986) demonstrated a statistically significant increase in health-promoting behaviors among patients who participated in a structured inpatient education program. Linde and Janz (1979) concluded that a comprehensive inpatient education program had a positive influence on compliance.

Two factors make it difficult to correlate this research with the research in the literature. First, there is a paucity of research done on outpatient education programs. Second, the research that has been done has been inadequately reported or did not measure the same variables.

Incidental Findings

Males scored significantly higher than females on the knowledge assessment pretest. There was no significant difference between males' and females' knowledge assessment scores on posttest 1 or 2. No reason for this difference can be cited.

There was no significant difference on test scores for patients who were participating in a phase II cardiac rehab program at the time of the study and patients who were not. There was only one patient in a phase II cardiac rehab program in each group, however. This very small number may account for the failure to be significant.

There was a significant difference between scores on posttest 1 when comparing patients who had had a previous PTCA with patients who had not had a previous PTCA. Posttest 1 was taken only by the experimental group. The education program may have been reinforcing prior learning for this group of patients which accounted for the increase in knowledge. The increase in knowledge was not retained for six weeks, however.

Patients with more than a high school education scored significantly higher on all knowledge assessments than patients with a high school education or less. These patients may have been better learners or more highly motivated to learn. They may also have been more accustomed to taking tests than the group with less education.

Limitations

One of the limitations of the study was that the length of time from the first contact with the subjects to the time of the intervention varied. This limitation did not affect knowledge as the groups were equivalent on their pretest scores. It may have affected responses on the lifestyle assessment tool, however. The lifestyle assessment tool asked what the subject's actions had been over the last six weeks in the areas of smoking, exercise, nutrition and stress management. Subjects who had been out of the hospital for several weeks before receiving the lifestyle assessment tool to complete may have included the weeks since discharge from the hospital in the six week time frame. The subject may have begun making healthy behavior changes after receiving the diagnosis of coronary heart disease and after receiving information on risk factors in the hospital. He/she may have indicated this in his/her responses. What the investigator wanted to learn was what the subject's actions had been over the six weeks prior to the PTCA.

The convenience sample and small sample size were limitations. These problems may have caused a Type II error.

Another limitation of this study was the low reliability measure of the knowledge assessment. The Pearson product-moment test of reliability was used and measured .569. This low test of reliability also makes it difficult to generalize these findings to other groups.

Another limitation of this study was that the investigator was able to answer questions and give verbal instructions to the experimental group and

was not able to do this for the control group. This advantage may have resulted in more accurate completion of the forms by the experimental group.

The nursing component of the outpatient education program is taught by a different one of the four phase I nurses every month. This is a variable which was not controlled for in this study.

Implications for Nursing

Nursing considers patient education to be one of its primary roles. The results of this study seem to indicate that patients made healthy behavior changes as a result of an outpatient education program. It was not shown that any harm was done to the patients as a result of the program. The fact that patients participate in this program indicates that it is valued by them. These observations support the continuance of this program.

Patients in the control group learned on their own but did not make healthy behavior changes on their own. Means to promote healthy behavior changes, such as follow-up, support and including significant others, may enable patients who learn on their own to also make healthy behavior changes.

Nurses can explore with patients their preferred method of learning and help to facilitate that process. Nursing can also be involved in developing independent learning methods such as a self-instructional program.

The four categories of the HBM, the conceptual framework for this study, are the variables which influence behavior. They are perceived susceptibility to disease, perceived severity of the disease, perceived benefits of and barriers to preventive care and cues to action. The outpatient

education program was the cue to action in this study to stimulate behavior change. It may not have been a strong enough cue to action, however. Different or stronger cues to action may need to be developed by nursing.

Recommendations for Future Research

More research on the effectiveness of outpatient patient education programs needs to be done. This study could be replicated with the use of more reliable instruments and a larger sample size. A longitudinal study to determine adherence to healthy behaviors changes could also be done.

Research could also be done on outpatient education programs with different formats. The programs could be evaluated on their own merits or compared with other formats.

The effectiveness of inpatient and outpatient education programs could be compared in a single study. Motivation to learn is a variable that needs to be controlled for in studies evaluating patient education programs.

The variables of the Health Belief Model could be investigated. For populations who have been diagnosed with a health problem and perceive their resusceptibility to it, the variables of perceived severity, benefits and barriers to treatment and cues to action could be investigated.

Most of the research has been done on structured learning activities. Research could be done on independent learning activities also since this is the way most people learn.

In conclusion, this study has contributed to the body of nursing knowledge by being one of the few studies on the effectiveness of an

outpatient education program on knowledge and healthy behavior change. As the amount of education done in the outpatient setting increases, there will be a need for more research in this arena. This study can serve as a stepping-off point for future research.

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Appendix A

Consent Form

My name is Carolyn Ehm. I am a graduate student in nursing at Drake University and I am interested in investigating educational programs for heart patients. Because you have had a balloon angioplasty and because you have been invited to attend an outpatient educational program designed for individuals who have had this procedure, I am inviting you to serve as one of the 40 subjects in this study. You may participate in the outpatient educational program without taking part in this study as an alternative.

Because this study is designed to compare those who attend the educational program with those who don't attend, you are invited to participate regardless of your decision to attend the program.

Individuals who attend the program will be asked to complete three short questionnaires before the program begins. Those subjects who do not attend the program will be mailed these same questionnaires and asked to return them in a stamped, addressed envelope that will be provided. It will take about 15-20 minutes to complete the questionnaires. At the end of the educational program, one short questionnaire will be given to those in attendance. It will take about 10-15 minutes to fill this out.

Six weeks later all individuals in the study will be mailed two questionnaires and asked to return them in a stamped, addressed envelope that will be provided.

The only foreseen discomfort or risk to you is the psychological stress of taking a test. The only foreseen inconvenience is the time it will take to complete the forms. The benefit of participating in the study is the opportunity to help improve patient care. You may request a copy of the results of the study by calling me at (515) 247-3145 or (515) 277-2846.

You will not be compensated for participating in this study nor will there be any cost to you. There is no charge for the outpatient education program.

Any information that is obtained in connection with this study will remain confidential and will only be reported as group results.

Your decision whether or not to participate will not prejudice your future relations with Mercy Hospital Medical Center. If you decide to participate, you are free to discontinue participation at any time without prejudice.

If you have any questions, including questions regarding this study or your rights as a research subject, please ask me or call my advisor, Dr. Linda Brady at (515) 271-2830. If you have any additional questions later, I will be happy to answer them and can be reached at either of the above phone numbers. You will be offered a copy of this form to keep.

You are making a decision whether or not to participate. Your signature indicates that you have read the information provided above and have decided to participate. You may withdraw at any time without prejudice after signing this form should you choose to discontinue participation in this study.

_____ _____

Signature Date

_____ _____

Signature of Investigator Date

_____ _____

Witness Date

Code

Appendix B

KNOWLEDGE ASSESSMENT

Understanding Heart Disease

Circle the small letter for the statement you believe to be true.

1. Coronary artery disease

   a. is a build-up of plaque in the arteries that feed the heart.

   b. develops over a short period of time.

   c. is cured by the balloon procedure or open heart surgery.

   d. affects only people over the age of 55 years.

2. Symptoms of coronary artery disease usually show up when the blockage is

   a. 50-60%.

   b. 60-75%.

   c. 75-85%.

   d. 75-99%.

3. A heart attack occurs when

   a. the blockage of an artery is 100%.

   b. there is insufficient blood flow to the heart for an extended period of time.

   c. a blood clot closes off a partially blocked artery.

   d. all of the above.

4. The damage in a heart attack is due to

    a. too much fat in the blood.

    b. too little blood to the heart muscle.

    c. too little blood into the heart chambers.

    d. no heart damage; only damage is a clot in a blood vessel.

5. The pain involved in a heart attack is from:

    a. heart irritability.

    b. too little oxygen to the heart muscle.

    c. too little blood to the heart chambers.

    d. damaged heart muscle.

6. The healing of the heart following a heart attack is

    a. never complete, leaving a "soft spot."

    b. totally complete, leaving no trace of damage.

    c. characterized by a scar that causes dysfunction of the heart muscle.

    d. none of the above.

7. PTCA (the balloon procedure)

    a. permanently removes the plaque from the artery.

    b. is a cure for coronary artery disease.

    c. compresses the plaque along the inside of the artery wall.

    d. never needs to be done more than once to the same blockage.

8. Recurrence of symptoms following PTCA means

a. nothing and should be ignored.

b. that the artery may have re-blocked and should be immediately reported to the doctor.

c. that healing is taking place.

d. that the artery may be re-blocking but that it can wait until your next appointment with the doctor.

Coronary Risk Factors

True or false (mark T for true and F for false.)

9. T____ F____Coronary risk factors are things shown to be linked to the development of coronary artery disease.

10. T____ F____All 10 coronary risk factors are modifiable by the individual.

11. T____ F____The more risk factors one has, the greater the risk of developing coronary artery disease.

12. T____ F____Smoking, hypertension and elevated cholesterol are the most powerful, modifiable risk factors.

13. T____ F____Diabetes is not a coronary risk factor.

14. T____ F____Women's risk of developing coronary artery disease after menopause is equal to men's risk.

Exercise For a Healthy Heart

Circle the small letter for the statement you believe to be true.

15. The kind of exercise that increases the strength of the heart is

    a. aerobic (with oxygen) which uses the large muscles, in repetitive movement for 15-20 minutes at one time.

    b. anerobic (without oxygen) which involves short bursts of energy expenditure.

16. Examples of types of exercise to strengthen the heart are:

    a. golf, bowling, horseshoes.

    b. walking, biking, swimming.

    c. tennis, basketball, sprinting.

17. In regards to an exercise program, one should

    a. exercise a minimum of 3 nonconsecutive days per week.

    b. attempt to raise the heart rate to 70-85% of age related maximum heart rate.

    c. have a period of warm-up, aerobic conditioning and cool-down.

    d. all of the above.

A Healthier Way of Eating

True or false (mark T for true and F for false.)

18. T____ F____A healthy body weight can be reached by following a low fat diet.

19. T____ F____A healthy way of eating includes no more than 30% of calories from fat

20. T____ F____Dietary cholesterol is only found in animal products.

21. T____ F____Increasing carbohydrates is not a good idea because they are high in calories.

22. T____ F____Processed meats are lower in sodium than fresh meats.

Stress Management

Circle the small letter for the statement you believe to be true.

23. Stress

a. is always bad.

b. is any demand put on the body.

c. has no effect on bodily functions such as heart rate, blood pressure and respirations.

d. none of the above.

24. Stressors may be

a. personal.

b. long or short-term.

c. uncontrollable.

d. all of the above.

25. Stress management includes

a. always avoiding stress.

b. taking on extra responsibilities in order to forget about stress

c. evaluating current coping methods and developing new ones.

d. taking drugs or drinking alcohol to relax.

Answers

Understanding Heart Disease

1. a 2. d 3. d 4. b 5. b 6. c 7. c 8. b

Coronary Risk Factors

9. T 10. F 11. T 12. T 13. F 14. T

Exercise For a Healthy Heart

15. a 16. b 17. d

A Healthier Way of Eating

18. T 19. T 20. T 21. F 22. F

Stress Management

23. b 24. d 25. c

Code

Appendix C

LIFESTYLE ASSESSMENT

Please indicate what your actions have been over the last 6 weeks in the following areas by circling the appropriate response.

I have not smoked (previous smokers only). Agree Disagree

I have exercised with the purpose of raising my heart rate into my training zone for at least 20 minutes at least 3 days per week. Agree Disagree

My stress levels have been manageable. Agree Disagree

I have restricted fat and cholesterol in my diet. Agree Disagree

If you agree with this statement, please list 3 ways you have restricted fat and cholesterol in your diet:

1. _____

2. _____

3. _____

I have restricted sodium in my diet. Agree Disagree

If you agree with this statement, please list 3 ways you have restricted sodium in your diet:

1. _____

2. _____

3. _____

_____
Code

Appendix D

DEMOGRAPHIC DATA

Please supply the following information:

Age_____

Male_____ Female_____

Highest level of education:

_____completion of 8th grade or less _____some high school

_____completion of high school _____some college

_____completion of bachelor's degree or above

Are you currently participating in an outpatient cardiac rehabilitation program?_____yes_____no

Have you undergone the balloon procedure before this time?_____yes_____no

What have been your sources of information regarding heart disease?

Check as many as apply:

_____Newspaper and/or magazines

_____Television and/or radio

_____Your physician

_____Nurse

_____Family or friends

_____Educational programs

_____Other (please describe)_____

Appendix E

Cover Letter

Dear

When you were hospitalized recently you agreed to participate in a study concerning educational programs for heart patients. Although you did not attend the outpatient educational program for patients who have had balloon angioplasty, your participation in the study is still important. Please complete the enclosed questionnaires and return them in the envelope provided within the next week. Do not refer to any educational materials or confer with anyone when answering the questions on the knowledge assessment. I am interested in what you recall from your hospitalization and what you have learned on your own. Your answers will remain confidential. If you have any questions about completing the questionnaires or any other aspect of the study, feel free to call me at either (515) 247-3145 or (515) 277-2846.

Thank-you for taking the time to complete these questionnaires. You will receive two more questionnaires to complete and return in six weeks.

Sincerely,

Carolyn Ehm

Appendix F

Cover Letter

Dear

Enclosed are the final two questionnaires to be completed by you as part of the study you are participating in concerning educational programs for heart patients. Please complete them and return them to me in the envelope provided within the next week. Do not refer to any educational materials or confer with anyone when answering the questions on the knowledge assessment. Your answers will remain confidential. If you have any questions about completing the questionnaires or any other aspect of the study, feel free to call me at either (515) 247-3145 or (515) 277-2846. Thank-you for participating in my study.

Sincerely,

Carolyn Ehm

Appendix G

Fat and Cholesterol

Response	Control group	Experimental group
Read labels	1	1
Limit fat	1	4
Increase fruits and vegetables	1	5
Limited saturated fat	2	2
Limit red meat	8	6
Limit eggs	4	6
Increase lean meat, poultry	4	5
Use lowfat dairy products	6	6
Limit cheese	2	1
Smaller portions	1	1
Limit fried foods/ increase baked	7	3
Limit margarine use	3	0
Increase fish	1	1
Use fat free dressing, mayonnaise	1	0
Remove skin from chicken	1	0
Trim fat on meat	1	2
No butter	2	2
Avoid junk food, chocolate	1	0

Appendix H

Fat and Cholesterol

Response	Control group	Experimental group
Read labels	5	7
Limit fat	1	5
Increase fruits and vegetables	4	2
Limited saturated fat	3	1
Limit red meat	8	9
Limit eggs	3	5
Increase lean meat, poultry	5	6
Use lowfat dairy products	6	4
Limit cheese	0	1
Smaller portions	0	0
Limit fried foods/ increase baked	6	6
Limit margarine use	0	2
Increase fish	2	3
Use fat free dressing, mayonnaise	0	0
Remove skin from chicken	0	0
Trim fat on meat	0	2
No butter	1	0
Avoid junk food, chocolate	1	1

Appendix I

Sodium

Response	Control group	Experimental group
Read labels	4	5
Limit salt in food preparation	12	6
Eliminate added salt	11	7
Use salt substitute	3	6
Limit pickles	0	1
Limit junk food	2	2
Limit processed meats	2	2
Use salt free crackers	1	0
Limit cereals high in sodium	1	0
Limit canned soups	2	0
Buy very low sodium food	5	4
Replace salt with other spices	2	0
Use fresh or frozen vegetables	0	3
Limit prepared foods	0	1

Appendix J

Sodium

Response	Control group	Experimental group
Read labels	5	7
Limit salt in food preparation	8	10
Eliminate added salt	13	12
Use salt substitute	4	6
Limit pickles	2	1
Limit junk food	1	1
Limit processed meats	5	8
Use salt free crackers	2	0
Limit cereals high in sodium	0	0
Limit canned soups	4	1
Buy very low sodium food	4	5
Replace salt with other spices	0	1
Use fresh or frozen vegetables	0	3
Limit prepared foods	0	1